

9973 San Francisco Bay & Delta Sensitive Sites

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9973.01 Introduction: San Francisco Bay and Delta Geographic Response Plans

The San Francisco Bay and Delta Sensitive Sites are now organized into ten Geographic Response Plans. These plans each include all the sites in a particular basin or bay, such as the Central Bay or San Pablo Bay. Index maps make it possible to quickly locate the Sensitive Sites affected by a spill, while decision aids located at the front of each GRP are intended to enable the Incident Command to organize an effective response within minutes of the initial report.

The San Francisco Bay and Delta Sensitive Sites were formerly organized by County. This proved cumbersome in actual spill responses. For example, San Pablo Bay is bordered by four Counties. Organizing a spill response there required first assembling and collating the Sensitive Sites affected from four different chapters of the ACP. This took considerable time.

Reorganizing the Sites into GRPs necessitated renumbering them. A cross-index of the old and new site numbers is included as Section 9973.03.

9973.02 How to use the GRPs as a response tool

The GRPs may be used to establish response priorities during the first few hours of a spill. If the spill scenario (location, tide, and wind) is similar to that used to develop the GRP, the response priorities provided in the following GRPs may provide a quick guide for the responders until more accurate information from overflights and a simulation model are available. **However, the Response Priority Tables that accompany these Geographic Response Plans (GRPs) are scenario and trajectory specific, and should not be interpreted to be the priorities in every incident occurring within the region covered.** Even a small change in any aspect of the scenario may greatly change the priorities. However, the methods used to establish the response priorities in these GRPs can be used to establish the response priorities for any spill scenario real or hypothetical.

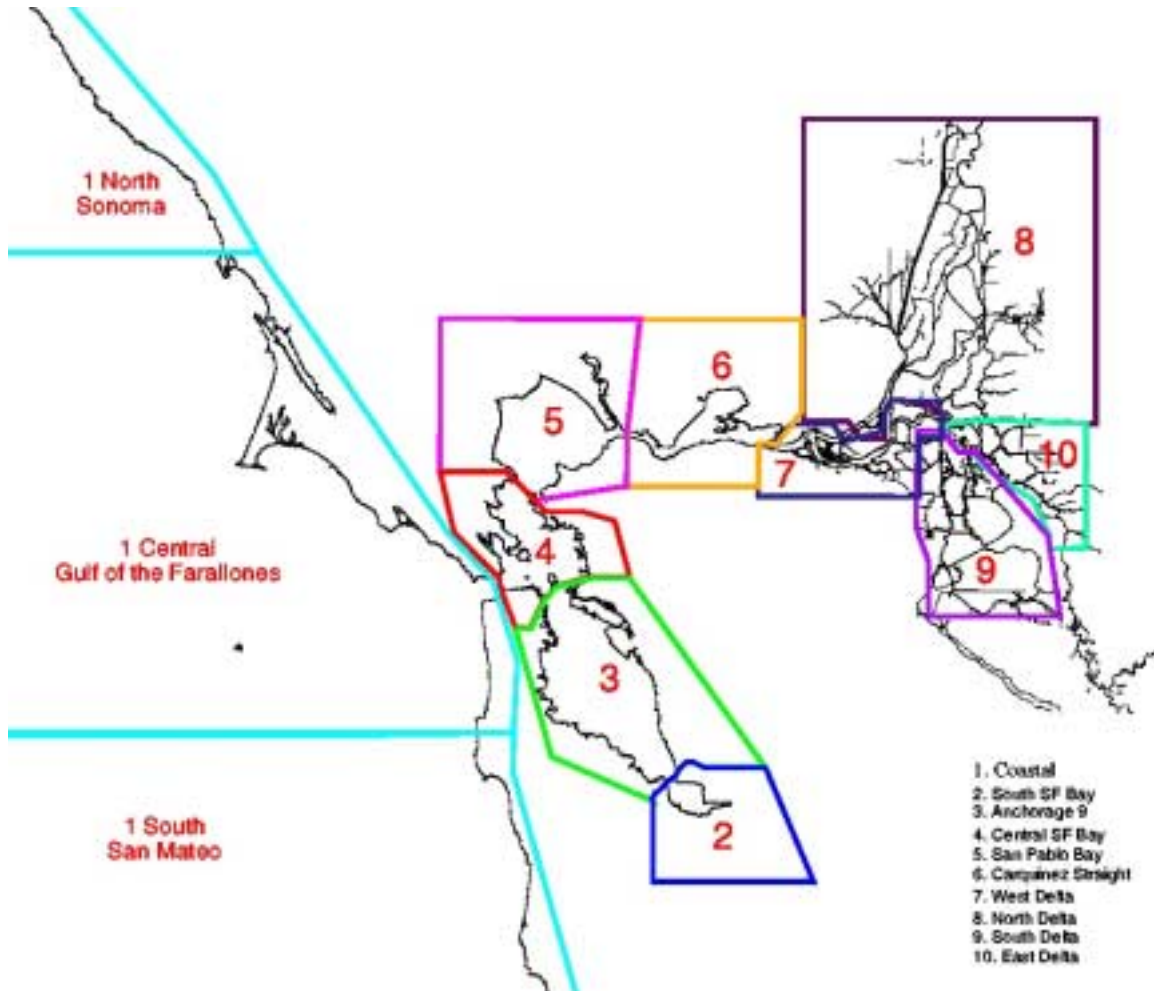
There are several steps in the process. A ten step guide for the spill responder is provided below. It is helpful to have some method of predicting the oil distribution at varying times after the start of the spill. In areas influenced by strong tidal currents, predicting the oil distribution at the slack tides is especially useful. All predictions of the future distribution of the oil must be based on the most recent aerial observations if they are available. However, predictions must be made on some modeling assumptions. If a computer model is not available to predict the oil trajectory the prediction must be based on the tide and current tables and the expected wind velocity over the oil slick.

Multiply the number of hours between the time the spill began and the time of the next slack tide by the maximum tidal velocity in knots expected at the tide station closest to the spill source. This calculation yields the maximum distance that the oil can be expected to travel before the tide turns and begins to carry the oil in the opposite direction. The same method can be used to calculate the maximum distribution of the oil at subsequent slack tides. The time between slack tides is about 6 hours. The distance the oil will travel between one slack tide and the next may approach 6 times the maximum expected tidal velocity. Any expected current due to runoff should be added or subtracted from the tidal velocity as appropriate. Shorelines downwind from the oil distribution at the low slack tide are especially vulnerable to oiling and should be given an especially high response priority.

A ten step guide for the spill responder:

1. Find the spill source on the map of the San Francisco Bay / Delta Area (on p. 4).
2. Turn to the appropriate GRP map at the front of its respective GRP.
3. Identify the environmentally sensitive sites and their response strategies within the predicted oil distribution at a given time.
4. Turn to the list of response priorities for that GRP.
5. Are the conditions listed in the first column of the table similar to current conditions.
- 6a. If “yes” use that list of response priorities.
- 6b. If “no” List “A” priority sites in the order in which the oil is expected to arrive. (See text above for method of predicting time of arrival of oil if no spill trajectories are available)
7. Turn to the Sensitive Site Resource List (Section 9970) that lists the equipment and personnel required to implement each strategy.
8. Dispatch personnel and equipment required to implement each response strategy.
9. Identify appropriate shoreline cleanup methods. If recommended shoreline cleanup methods are not discussed in the response strategy or are inappropriate to the scenario, select a method from the shoreline cleanup countermeasures matrix (Section 4611.20) for the type of oil spilled and each shoreline type oiled.
10. Order and dispatch personnel and equipment necessary for the preferred cleanup method.

San Francisco Bay & Delta Section 9973



9973.03 General Principals for Implementing the San Francisco Bay and Delta Sensitive Site Strategies

The purpose of this section is to provide the reader with background, insights, and philosophy behind the site strategies and geographic response planning in the following section. The sensitive site information and strategies and the geographic response summaries are produced through the Area Committee's Sensitive Site / Geographic Response Plan (SS/GRP) Subcommittee. The SS/GRP subcommittee is responsible for approving sites as sensitive (using section 9971.11 describing A, B, and C) gathering information about sensitive sites, developing protective strategies for sites, revising strategies by including lessons learned and casting scenarios for each geographic division of the area and enumerating a timetable of impacts and resources needed for response (GRP).*

The SS/GRP Subcommittee has agreed on a number of assumptions that consistently underlie all the Site Strategies for the San Francisco Bay/Delta ACP. These assumptions address: (1) Strategies are intended as guidelines; (2) Response Time and Timeliness of Response; (3) Boom Boat Equivalents (BBE's); (4) Booming Systems; (5) Skimming Equipment; (6) Use of Dispersants in Conjunction with Site Strategies; and (7) Helicopter or Plane Overflights in Sensitive Site Area; and (8) Acronyms used to is strategy descriptions. These notions are both underlying and included in the strategy development. It is hoped that the articulation of these assumptions will assist both contingency planning and response efforts for sensitive sites.

Furthermore, as of 1999, the site information and strategies and updates to that information are maintained in a database form. The SISRS (Site Information and Spill Response Strategy) Database is the vehicle for information maintenance and the ACP pages that follow are derived from that database. The information (data) in the following pages are available from the USCG: MSO SF both in a text file and in an ACCESS (TM) database format and are a report product of the SISRS Database. As the SS/GRP subcommittee updates strategies and incorporates lessons learned, the SISRS Database is updated and the local staff of the California Department of Fish and Game maintains this updated response version.

The SISRS Database contains the entire site summary and site strategy information found on the following pages except the strategy diagrams (which may be remedied in the year 2000). In addition the SISRS Database includes information about the sites, which is not include in the following pages. The information in the database will be incorporated with the Department of Fish and Game, Office of Spill Prevention and Response GIS system in the near future.

1. Strategies are intended as Guidelines. It is important to state clearly and emphatically that the intent of the site strategies is to provide initial recommendations to protect the site until actual conditions and needs at sensitive sites can be used to provide situationally tailored strategies. In other words, strategies presented here are flexible and will require modification in real response situations. As written and diagramed, these strategies are the best available response for foreseeable typical wind and current conditions at sites. Such conditions may not prevail at the time of the spill. Responders and planners will need to alter strategies to meet the needs presented by prevailing conditions. All alterations must be submitted to the IC in a timely fashion. These alterations should, as much as possible, be undertaken with the prior advisement of the on scene natural resource manager.

2. Response Time and Timeliness of Response. For planning purposes, the resources listed for each site have been chosen to facilitate execution of the protection strategy within a maximum of four hours, including travel time between the staging site and the deployment site. Thus, the amount of resources actually deployed will depend in part on the location of the staging site relative to deployment sites and the actual mode of resource delivery. For example, if a trailer can deliver 3600 feet of boom to a nearby dock for a site strategy that calls for 3600 feet of boom and 6 boats, just one or two boats, might be able to deliver and deploy this amount within the 4-hour time period. If the boom staging site is farther away, all six boats might be required to make the delivery within the same period. In general, a protective strategy should be executed in the shortest feasible time. The Planning Branch of the UC may recommend the deployment of additional resources over and above the recommended minimums, for maximum protection of a specific site or sites

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- 1998-99 San Francisco Bay/Delta SISRS/GRP Subcommittee members included representatives of the U.S. Coast Guard, the U.S. Environmental Protection Agency, the National Oceanic and Atmospheric Administration, the Gulf of the Farallones National Marine Sanctuary, the U.S. Fish and Wildlife Service, the National Park Service, the California Department of Fish and Game - Office of Spill Prevention and Response, the San Francisco Bay Conservation and Development Commission, the California Coastal Commission, the California Coastal Conservancy, the California State Lands Commission, Chevron USA, Exxon Corporation, Shore Terminals, Tosco Refineries, Clean Bay, Foss Environmental, MSRC, PacLink , Environmental, Blue Water Consulting, and the Center for Marine Conservation, and other public interest groups.

3. Boom Boat Equivalents (BBE's). To assist in response planning efforts, the Subcommittee has agreed on a basic "boom boat equivalent" (BBE) to provide consistency in boom delivery estimates. A BBE is the capacity to deliver 600 feet of harbor boom (see definitions below) to the deployment site. As described below, in some instances, swamp boom may be deployed instead of or in combination with harbor boom: the BBE for swamp boom is the capacity to deliver 1800 feet of swamp boom (see definitions below) to the deployment site. (See "Booming Systems," below, for further definitions of "harbor" and "swamp" boom.) As an example, a site requiring 3600 feet of boom would require 6 BBEs: 6 boats, each carrying 600 feet of harbor boom; or 3 boats, each carrying 1200 feet of boom.

The BBE allows planners, whether contingency or spill planners, plan for transportation and deployment of boom. This is important since different boom boats have different capacities and BBE allows planners to better gauge whether boom boats contracted meet the need, and at the same time enable flexibility by focusing on capacity rather than numbers of vehicles. The number of boats actually needed to deploy the total recommended amount of harbor or swamp boom to the site will vary with the type of boat, the size of boom carried, the length of the trip from the staging site to the deployment site, difficulty of site access, difficulty of deployment, tides, currents, weather, and other factors. If planners intend to expedite deployment, greater numbers of boom boats assigned to the deployment may hasten completion.

4. Booming Systems. Boom and booming systems are described here to enable planners and operations staff to better achieve their objectives. First, boom terminology used on the west coast is different than much of the rest of the U.S. and the World Oil Spill Catalog. In general, harbor boom (see definition below) is used as primary site protection in the San Francisco Bay/Delta Area, although some strategies call for swamp boom (river boom - see below). For response and planning purposes, harbor boom may be substituted for swamp boom and two consecutive layers of swamp boom are roughly equivalent to one layer of harbor boom.

However, responders should be aware of several issues and amend actions as necessary. Long-skirted booms in shallow channels can aggravate entrainment problems. In such instances, it may be inadvisable to substitute harbor boom for swamp boom.

Also, wherever oil accumulates against booms in rough or choppy conditions, there can often be the problem of oil washing over the flotation. This nullifies the booming. To avoid this problem, protective strategies are designed to avoid collection of oil in pockets (except for the purposes of skimming), and instead, are oriented to keep oil moving along booms to collection or deflection as much as the situation permits. Responders, both in operations and planning will need to adjust boom configurations to prevent excessive "pocketing" so as to minimize entrainment and over-wash. This may mean altering boom angles. This may also be unavoidable and require back-up layering of boom. Some strategies include this as a contingent alternative, but regardless, if over-wash is a problem, then a second layer should be viewed as the containment and deployed in the "shadow" of the becalming first layer. In some instances the lesser freeboard of swamp boom may provide adequate control once the wave has been broken.

Regardless of strategy design, deployment and adjustment remain key to successful booming. If strategies are not properly deployed, whether prescribed or amended, and maintained through proper anchoring and tending, the protective booming will be neutralized. Every effort by managers and responders should be made to ensure proper execution.

5. Skimming Equipment. This paragraph provides an introduction to skimming issues in site strategies. In the following strategies, the inclusion of self-powered skimming vessels is minimized in recognition that the first response resource priority is on-water skimming: the best protection for sensitive sites is to minimize oil impacting sites by best available means (ON WATER RECOVERY). However, shore-side skimming and defection offshore to skimming are integral parts of protecting the sensitive site or nearby sites at risk. The philosophy of strategy development includes the intent to leverage opportunities to control, capture, immobilize or collect oil at shorelines where possible. Once oil has impacted a site, it may be a reasonable tactic to keep it at that locale rather than let it re-mobilize to impact yet another site.

Since there are a variety of skimming units that may be included in the strategy, this preamble provides an opportunity to define skimming systems so that the elaborate descriptive verbiage need not be repeated in each strategy. A number of acronyms for skimming systems are included in the Acronyms and Nomenclature section below: TSA, SFS, SPS, and SSS

6. Use of Dispersants in Conjunction with Site Strategies. Dispersant technology is changing. New dispersants that are less toxic and less persistent than in the early 1990s are being developed and, as a result, the potential for dispersant use in vicinities where it was formerly not advisable is expanding. The OSPR's regulations regarding dispersant use (14 CCR section 886.1(e)(3)(B) and (4)(B)) allow the use of dispersing agents in open water within San Francisco Bay and Suisun Bay and along the outer coastline, if performed in accordance with guidelines established in the "Quick Approval Process for Dispersant

Use in Waters Off California" as developed by the California Department of Fish and Game and the National Oceanic and Atmospheric Administration, dated 4/14/97.

Pending the formal issuance of dispersant policies by OSPR, the SISRS/GRP Subcommittee recommends that, contrary to former assumptions, dispersant use should be considered concurrently with traditional response technologies for use near sensitive sites in San Francisco Bay/Delta, as well as along the outer coastline. While dispersants may not actually be used on a shoreline, in some instances their timely use in open waters, together with or instead of traditional response methods, may be the most effective way to prevent oil from reaching a sensitive shoreline. In particular, dispersants should be viewed as a viable and immediate strategy to be used in conjunction with skimming whenever it appears that skimming is likely to fail, partially or overall. In 1999, an "Ecological Risk Assessment of dispersant use in a SF Bay/San Pablo Bay" spill scenario, was conducted by USCG and DFG/OSPR and other trustees. This assessment revealed that the most demonstrable response impact reduction was achieved from dispersant use. Use of dispersants shall continue to be decided on a case-by-case basis though the ICS and RRT.

7. Helicopter or Plane Overflights in Sensitive Site Areas. Based on the experience of recent spills, the Subcommittee's members have concluded that the potential for injury to wildlife at sensitive sites from helicopter or plane overflights is far greater than is generally recognized. Post-spill monitoring in recent years has demonstrated that flights occurring within these zones can cause significant wildlife injuries; if flights are too close, there will most likely be a long term loss of the entire colony; restoration costs can be extremely expensive.

The Subcommittee recommends that aircraft flights should not occur within 1000 feet (horizontal or vertical) from bird colonies and pinnipeds haul-out or rookery areas. Furthermore, helicopters should not hover or linger at these locations even at the 1000 foot altitude. This is a guideline, and there are other considerations that must be included in flight operations. For example, the Wildlife Operations Plan (section 9710.4.2) provides for airplane reconnaissance overflights at 200 feet to locate threatened or oiled wildlife, and FAA regulations may specify much greater ceilings over certain locations including National Parks, refuges and National Marine Sanctuaries.

8. Acronyms and nomenclature used in strategies: To minimize repetitious verbiage in protection strategies, the following acronyms and nomenclature is used in strategies to articulate strategies.

Anchoring Systems – Whether expressly stated or not, anchoring systems must be sufficient to hold boom in the aggressive currents in SF Bay. To insure successful anchoring, the anchoring system should include: anchors with crown buoys to control placement, anchor chains which equal or exceed the weight of anchors, enough line to produce adequate scope to hold anchors (rule of thumb is 3:1 (line to depth), but 5-7:1 for high current areas), and a buoy between anchor line and boom to keep the anchor from sinking the boom under tension conditions.

BBE - boom boat equivalent – the capability of a vessel to transport and deploy 600 feet of Hboom or 1800 ft of swamp boom. Boom boats - a boat suitable for transporting, towing and deploying large amounts of boom, usually crewed with a helmsman and two crew for deployment, usually referenced in terms of BBE. Boom boats must be capable of grounding without sustaining damage. (Also see Shallow Water Boom boats and Very Shallow Water Boom Boats.)

Bboats - see boom boat

Danforth - refers to "danforth anchors" with chain, typically presented as a number of anchors and minimal weight (e.g., 3/12+ - means three anchors of a minimum of 12 lbs each) with at least an equal weight of anchor chain weight whether specified or not. Without substantial anchor chain weight, anchors will not hold. Northill anchors are equivalent.

Hboom - see harbor boom Harbor boom - an inland waters type boom (greater than 18" and less than 42" overall (flotation and skirt)) of a curtain boom design (skirted boom with solid flotation). Early strategies attempted to clarify boom size by indicating flotation and skirt as follows: 9X9+ which indicated a boom with at least 9" of flotation and 9" of skirt, and would now be interpreted as at least 18" overall.

sboom - sorbent boom, with or without a skirt

Shallow water boom boats - a boom boat capable of working in three feet of water or less, and should be able to withstand stranding without sustaining damage.

Skiff - a small two person craft able to operate in 3 foot waves or larger and capable of delivering personnel and equipment to shores.

Skf - see skiff

SFS - stationary floating skimmer - a floating platform supporting a skimmer and storage.

SPS - self-propelled skimmer - a small to medium sized skimmer with its own propulsion and storage.

SSS - shore side skimmer, includes a skimming unit, such as a ropemop or weir skimmer and its support pack and a storage container such as a vacuum truck, baker tank, or other tank.

SO – Strategic Objective. See paragraph 9 below.

swpbm - see swamp boom

Swamp boom - a river boom type (less than 18" overall) of a curtain boom design

Towed skimming array - a skimming system with two boats towing collection booms which funnel oil to a skimming system

TSA - towed skimming array - an array with two boats towing collection booms which funnel oil to a skimming system

VSA – “V”-Skimming Array -Same as TSA

“V”-Skimming Array -Same as TSA

Very shallow water boom boats - a boom boat capable of working in two feet of water or less, and should be able to withstand stranding without sustaining damage.

xboom – is any boom other than harbor boom, swamp, or sorbent boom. This term is used to simplify equipment tables. A type designator should be used as well as a length. Type designators include:

TB or TBB – tidal barrier boom

OB – ocean boom

FB – fence boom

OS – oil snare

BB – bushy boom

9. Strategic Objectives

Strategic Objectives are defined in section 4420. During the 1998-99 revision for the 2000 ACP publication, agency personnel noted some severe deficiencies in the structuring of the section, including some gross omissions. Sensitive Site Subcommittee personnel proposed revisions to the Strategic Objectives, and the strategy designers used these proposed strategic objectives in the revision to help define the intent of each strategy. This was deemed valuable to speed selection of alternative strategies when time or resources were in short supply. However, the timing was not adequate for the Area Committee to reach consensus on the exact wording. Although the revised Strategic Objectives are still under awaiting approval of the Area Committee, those proposed strategy objectives are defined below to enable the reader to correctly interpret references to “Strategic Objectives” as used throughout the strategies. **The Strategic Objectives listed below are only proposals.**

“4420.1 Strategic Objective 1 - Stop the Source.

“4420.2 Strategic Objective 2a - Contain the Spill.

Strategic Objective 2b – Confine the Spill. Once oil has left the immediate locale of origin, it frequently remains in the near-by area, particularly in the case of land-based facilities. One of the few great opportunities to minimize spread and environmental impacts is to confine it to the locale region of release if conditions permit. It is important that the IC and its strategists seek this often over-looked opportunity.

“4420.3 Strategic Objective 3 - Open Water Containment and Recovery. Once the effort is underway to secure the source and contain the spill, recovery of oil prior to shoreline impact is the next logical priority. Deploy major recovery vessels, boom-towing vessels and other on-water skimmers to intercept oil before it impacts critical areas or becomes a more costly and environmentally damaging shoreline cleanup problem.

“4420.4 Strategic Objective 4 - Dispersal, In-situ Burning, and other Alternative Response Technologies (ART): The primary objective of an oil spill response is to reduce the effect of spilled oil on the environment. Physical removal of the oil is the preferred method. However, conventional mechanical recovery and removal may be limited by equipment capability, weather and sea state conditions, the spill size, and the remote location of the spill. . The most common technique involves mechanical skimming devices that typically remove less than 20% of the spilled petroleum (National Research Council [NRC], 1989).

The use of alternative response countermeasures; dispersants, in-situ burning, and other oil spill cleanup agents (OSCA) including, bioremediants, shoreline cleaning agents, herding agents, and elasticizers should be considered when the preferred recovery methods, cleanup or remediation techniques are expected to be inadequate and the environmental benefit of ART use outweighs any adverse effects.

Use of dispersants or in-situ burning should be the primary consideration for any large off-shore discharges of oil where open water skimming operations may be difficult or where open water recovery could not occur before the oil impacted any of the environmentally sensitive areas located offshore, such as seal rookeries or nesting bird colonies. Use of dispersants should also be considered near shore and within bays when the UC is able to determine that environmental benefits of dispersal outweigh the environmental impacts on coastal sensitive resources, including marshes, bird life and marine mammals. This should be considered to augment other methods when major impacts are a threat to sensitive resources.

“4420.5 Strategic Objective 5 - Exclude Oil from Entering Sensitive Areas. Since the primary objective of an oil spill response is to reduce the effect of spilled oil on the environment, every opportunity should be exercised to exclude oil from entering sensitive sites or expanding impacts to new areas. Minimizing exposure of sensitive sites by closing inlets, sloughs, passages and channels, can reduce both the extent and degree of impacts. Exclusion and deflection to collection can be used to deny oil access to sensitive habitats, and so, reduce impacts and cleanup needs and impacts. This restriction of oil movement may be a simple closing of a tidal inlet which would admit oil to the interior of a marsh, or a major deployment at a channel leading to an bay, a river reach, or a lagoon where there are many sensitive sites. Even if the exclusions are not totally successful, it is reasonable to anticipate that the amount of oil and the degree of impacts will be reduced.

“4420.6 Strategic Objective 6 - Shore Line Collection: In keeping with the primary oil spill response objective to reduce the effect of spilled oil on the environment, directing oil to shoreline collection can remove oil from the environment and reduce its free spread. Oil will also move along and become stranded on windward shores. These patterns allow responders to focus oil at selected collection site, and in some instances restrict its free movements. Leverage natural shoreline collection where possible. Use natural collection opportunities whenever oil collects or recollects at or along a shore, which is favorable for collection and removal and where environmental sensitivities are low, or cannot be otherwise mitigated. Often times these natural shore collections are so dramatic that pre-protection cannot prevent oil collection at these locations. It may even be a preferable to create a single location within a sensitive site as opposed to allowing unrestricted oil movement and impacts. Each shoreline collection opportunity should be considered on a case-by-case basis by Resources at Risk Specialists to verify that impacts to sensitive sites and resources are minimal or unavoidable.

“4420.7 Strategic Objective 7 - Shoreline Deflection: When highly sensitive shorelines are threatened by oil slicks, diverting oil away or past the site to less sensitive area can reduce impacts to sensitive sites. Some sites are nearly impossible to cleanup or rehabilitate. Keeping heavy slicks of oil away from these sites is an important part of reducing the effects of spilled oil on the environment. Deflection may be combined with open-water recovery efforts to enhance on water recovery while protecting sensitive sites.

“4420.8 Strategic Objective 8 - Shore Line Protection: Depending on the ability to contain and collect spilled oil prior to impact, the protection of natural resources can compete for response resources with containment and collection efforts. Priority for protection these areas is a function of the value of the areas, (as prioritized in the following section) and the feasibility of protecting them. Dedicated open water containment equipment to protection these areas is not wise if oil that may otherwise have been recovered is merely free to strike other sensitive areas that have not been 'prophylactically' boomed. In general, employ tactics that do not weaken open water recovery operations; deploy resources that are not needed in the open water operations.

“4420.9 Strategic Objective 9 - Shoreline Cleanup: Shoreline cleanup is usually the consequence of the shortcomings of other response options. The need for it is a function of effective response to contain and collect oil, and the degree of oiling, the sensitivity of the shoreline type, and rate of natural remediation. Shoreline cleanup should be undertaken only when the risk of recontamination from floating oil is past. Pre-cleaning of beaches prior to impact can greatly facilitate cleanup, reduce costs, and reduce solid waste. The SCAT (Shoreline Cleanup Assessment Team) approach will be used to guide shoreline cleanup: SCAT teams will assess degree of oiling, cleanup methods to be used, and resources required to complete cleanup.

“4420.10 Strategic Objective 10 - Other Impacts Minimization Measures: There are other measures which must be undertaken during the course of spill response which serve to reduce the effect of spilled oil on the environment or the collateral impacts of the response itself. These include actions such as hazing, controlling access to sensitive areas, keeping helicopters away from bird and piniped rookeries. The specialists in the UC must take actions and review consequences to insure that impacts from oil and collateral impacts are minimized. “

9973.03 Cross-Index of Old and New Site Numbers

Alameda County

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A-2-232	SF-458-A	Emeryville Lagoon/Mudflats	9973-GRP4-91
A-2-233	SF-457-A	Berkeley Eelgrass Beds	9973-GRP4-87
A-2-234	SF-302-A	Alameda Eelgrass Beds	9973-GRP3-15
A-2-235	SF-303-A	San Leandro Bay	9973-GRP3-19
A-2-236	SF-306-A	Alameda Creek Marshes	9973-GRP3-36
A-2-237	SF-202-A	Newark/Plummer Creek	9973-GRP2-13
A-2-238	SF-203-A	Mowry Slough	9973-GRP2-17
A-2-239	SF-204-A	Coyote Creek	9973-GRP2-21
A-2-258	SF-307-A	Coyote Hills Slough Marshes	9973-GRP3-38
A-2-259	SF-305-A	San Lorenzo Creek to Johnson Landing	9973-GRP3-28
A-2-274	SF-201-A	Dumbarton Point Marsh/Mudflat	9973-GRP2-10

Contra Costa County

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A-2-224	SF-607-A	Belloma Slough	9973-GRP6-25
A-2-225	SF-605-A	Hastings Slough, Point Edith	9973-GRP6-21
A-2-226	SF-603-A	Bulls Head Marsh	9973-GRP6-17
A-2-227	SF-601-A	Martinez Marsh	9973-GRP6-12
A-2-228	SF-454-A	Richmond Inner Harbor	9973-GRP4-75
A-2-229	SF-501-A	Castro Creek Slough	9973-GRP5-11
A-2-230	SF-451-A/B	Castro Rocks	9973-GRP4-63
A-2-231	SF-452-A	Richmond Eelgrass Beds	9973-GRP4-67
A-2-260	SF-456-A	Albany Marsh	9973-GRP4-83
A-2-261	SF-453-A	Brooks Island	9973-GRP4-71
A-2-262	SF-502-A	San Pablo Creek Marshes	9973-GRP5-15
A-2-263	SF-503-A	Pinole Pt. Marshes	9973-GRP5-19
A-2-264	SF-505-A	Pinole Creek and Wetlands	9973-GRP5-27
A-2-266	SF-608-A	Shore Acres Marsh	9973-GRP6-29

Marin County

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A-2-021	SF-120-A	Estero Americano	9973-GRP1-63
A-2-022	SF-121-A	Estero de San Antonio	9973-GRP1-67
A-2-023	SF-123-A	Tomales Bay	9973-GRP1-73
A-2-024	SF-124-A	Sand Point to Toms Point	9973-GRP1-77
A-2-025	SF-125-A	Walker Creek and Delta	9973-GRP1-79
A-2-026	SF-126-A	Hog Island	9973-GRP1-81
A-2-027	SF-127-A	White Gulch	9973-GRP1-83
A-2-028	SF-128-A	Pelican Point	9973-GRP1-85
C-2-029	SF-129-C	Cypress Grove Preserve	9973-GRP1-87
A-2-030	SF-130-A	Sacramento Landing	9973-GRP1-89
A-2-031	SF-131-A	Tomasini Point	9973-GRP1-91
A-2-032	SF-132-A	Millerton Point	9973-GRP1-93

Marin County (Cont.)

Old #	New #	Site Name	Page #
A-2-033	SF-133-A	Inverness.	9973-GRP1-95
A-2-034	SF-134-A	Lagunitas Creek & Delta Marsh	9973-GRP1-97
A-2-035	SF-135-A	Bird Rock	9973-GRP1-99
A-2-036	SF-136-A	Abbott's Lagoon	9973-GRP1-101
A-2-037	SF-138-A	Pt. Reyes and Headlands	9973-GRP1-105
A-2-038	SF-140-A	Drakes Estero	9973-GRP1-111
A-2-039	SF-141-A	Limantour Spit	9973-GRP1-115
B-2-040	SF-142-B	Point Resistance	9973-GRP1-117
B-2-041	SF-143-B	Miller Point	9973-GRP1-119
A-2-042	SF-144-A	Double Point & Stormy Stack	9973-GRP1-121
B-2-043	SF-145-B	Duxbury Reef	9973-GRP1-123
A-2-044	SF-146-A	Bolinas Lagoon	9973-GRP1-125
A-2-045	SF-147-A	Redwood Creek/Big Lagoon/Muir Beach	9973-GRP1-129
A-2-046	SF-148-A	Rodeo Lagoon	9973-GRP1-131
A-2-047	SF-149-A	Bird Island	9973-GRP1-131
C-2-048	SF-150-C	Point Bonita & Bonita Cove	9973-GRP1-135
C-2-049	SF-151-C	Pt. Diablo to Lime Point	9973-GRP1-137
C-2-077	SF-122-C	Dillon Beach Rocks	9973-GRP1-71
A-2-078	SF-137-A	Point Reyes Beach	9973-GRP1-103
A/C-2-079	SF-139-AC	Drakes Beach (West)	9973-GRP1-107
A-2-201	SF-420-A	Richardson Bay Marshes	9973-GRP4-31
B-2-202	SF-424-B	Paradise Cove	9973-GRP4-47
A-2-203	SF-425-A	Corte Madera Marshes	9973-GRP4-51
A-2-204	SF-426-A	San Rafael Creek Marsh	9973-GRP4-55
A-2-205	SF-427-A/C	Marin Islands	9973-GRP4-59
A-2-207	SF-552-A	China Camp Marsh	9973-GRP5-35
A-2-208	SF-553-A	Gallinas Creek Marshes	9973-GRP5-39
A-2-209	SF-554-A	Novato Creek Marshes	9973-GRP5-43

Napa County

Old #	New #	Site Name	Page #
A-2-212	SF-581-A	Sonoma Creek/Napa Slough	9973-GRP5-56
A-2-213	SF-583-A	Napa River Marshes	9973-GRP5-64

San Francisco County

Old #	New #	Site Name	Page #
A-2-050	SF-152-A	Farallon Islands	9973-GRP1-139
A-2-051	SF-153-A	Land's End	9973-GRP1-141
A-2-052	SF-154-A	Cliff House and Seal Rocks	9973-GRP1-143
A-2-053	SF-155-A	Ocean Beach/Fort Funston	9973-GRP1-145
A-2-253	SF-361-A	Airport Mudflat	9973-GRP3-56
B-2-254	SF-352-B	South Basin, Hunters Point	9973-GRP3-44

San Francisco County (Cont.)

Old #	New #	Site Name	Page #
A-2-255	SF-351-A	Yerba Buena Island	9973-GRP3-40
B-2-256	SF-401-A/B	Pier 39	9973-GRP4-19
B-2-257	SF-402-A/B	Alcatraz Island	9973-GRP4-23

San Mateo County

Old #	New #	Site Name	Page #
A-2-054	SF-156-A	Thornton Beach State Park	9973-GRP1-147
B-2-055	SF-157-B	San Pedro Creek	9973-GRP1-149
A-2-056	SF-158-A	Shelter Cove	9973-GRP1-151
B-2-057	SF-159-B	Point Montara Area	9973-GRP1-153
B-2-059	SF-161-B	Seal Cove to Pillar Point	9973-GRP1-155
A-2-060	SF-162-A	Pillar Point Marsh	9973-GRP1-157
A-2-062	SF-164-A	Naples Beach to S. Miramontes Pt	9973-GRP1-161
A-2-063	SF-165-A	Martins Beach	9973-GRP1-163
A-2-064	SF-166-A	Tunitas Beach and Creek	9973-GRP1-165
A-2-066	SF-168-A	Mussel Rock to San Gregorio Beach	9973-GRP1-167
A-2-067	SF-169-A	San Gregorio Creek	9973-GRP1-169
A-2-069	SF-170-A	Pescadero Marsh	9973-GRP1-175
B-2-070	SF-172-B	Pescadero Point to Pebble Beach	9973-GRP1-179
A-2-071	SF-173-A	Gazos Creek	9973-GRP1-181
B-2-072	SF-174-B	Whitehouse Creek	9973-GRP1-185
A-2-073	SF-175-A	Año Nuevo Island	9973-GRP1-187
A-2-074	SF-176-A	Point Año Nuevo	9973-GRP1-189
A-2-076	SF-177-B	Franklin Pt. to Waddell Creek	9973-GRP1-193
A-2-248	SF-367-A	Greco Island/Ravenswood Slough	9973-GRP3-80
A-2-249	SF-364-A	Bair Island	9973-GRP3-68
A-2-250	SF-366-A	Corkscrew Slough	9973-GRP3-76
A-2-251	SF-363-A	Steinberger Slough	9973-GRP3-64
A-2-252	SF-362-A	Belmont Slough	9973-GRP3-60
A-2-272	SF-365-A	Redwood Creek	9973-GRP3-72

Santa Clara County

Old #	New #	Site Name	Page #
A-2-239	SF-204-A	Coyote Creek	9973-GRP2-21
A-2-240	SF-256-A	Alviso Slough	9973-GRP2-45
A-2-241	SF-255-A	Guadalupe Slough	9973-GRP2-41
A-2-242	SF-253-A	Mountain View Slough	9973-GRP2-33
A-2-243	SF-252-A	Charleston and Mayfield Sloughs	9973-GRP2-29
A-2-244	SF-251-A	Palo Alto Marsh	9973-GRP2-25
A-2-245	SF-257-A	Mallard Slough	9973-GRP2-49
A-2-273	SF-254-A	Stevens Creek	9973-GRP2-37

Solano County

Old #	New #	Site Name	Page #
A-2-212	SF-581-A	Sonoma Creek/Napa Slough	9973-GRP5-56
A-2-213	SF-583-A	Napa River Marshes	9973-GRP5-64
A-2-214	SF-582-A	N. E. San Pablo Bay	9973-GRP5-60
A-2-215	SF-651-A	Southhampton Bay	9973-GRP6-47
A-2-216	SF-655-A	Montezuma and Suisun Slough Mouths (Joice Island)	9973-GRP6-59
A-2-218	SF-632-A	Ryer Island	9973-GRP6-39
A-2-219	SF-631-A	Roe Island	9973-GRP6-35
A-2-220	SF-660-A	Grizzly Bay	9973-GRP6-63
A-2-221	SF-670-A	Honker Bay	9973-GRP6-79
A-2-268	SF-633-A	Middle Ground Island	9973-GRP6-43

Contra Costa (Delta)

Old #	New #	Site Name	Page #
A-2-700	SF-700-A	Entrapment Zone	9973-GRP7-7
A-2-702	SF-702-A	Stake Point Marshes	9973-GRP7-9
A-2-705	SF-705-A	Mallard Island	9973-GRP7-13
A-2-721	SF-712-A	Winter Island	9973-GRP7-21
A-2-722	SF-710-A	Browns Islands	9973-GRP7-17
A-2-724	SF-715-A	Pittsburg-Antioch Marsh	9973-GRP7-25
A-2-737	SF-718-A	Antioch Dunes National Wildlife Refuge	9973-GRP7-29
A-2-738	SF-719-A	Antioch Dunes and Quarry Canyon	9973-GRP7-31
A-2-740	SF-730-A	Big Break Complex	9973-GRP7-33
A-2-744	SF-734-A	Dutch Slough East	9973-GRP7-37
A-2-745	SF-735-A	False River	9973-GRP7-41
B-2-746	SF-736-A	Taylor Slough and West Piper Slough	9973-GRP7-45
A-2-748	SF-737-A	Little Franks Tract	9973-GRP7-49
B-2-749	SF-742-A	Fishermans Cut	9973-GRP7-57
B-2-750	SF-740-A	Sherman-Webb Reach	9973-GRP7-53
A-2-830	SF-900-A	Old River Mouth at San Joaquin River	9973-GRP9-7
A-2-832	SF-905-A	Franks Tract Complex	9973-GRP9-11
A-2-833	SF-908-A	Sand Mound Slough	9973-GRP9-13
A-2-841	SF-915-A	Rock Slough	9973-GRP9-21
B-2-845	SF-920-B	Old River: Orwood Reach	9973-GRP9-29
A-2-847	SF-922-A	Indian Slough	9973-GRP9-33
A-2-850	SF-925-A	Old River: Coney Island Reach	9973-GRP9-41

Sacramento County (Delta)

Old #	New #	Site Name	Page #
A-2-700	SF-700-A	Entrapment Zone	9973-GRP7-7
A-2-716	SF-770-A	Chain Island	9973-GRP7-85
A-2-717	SF-765-A	Montezuma Island and Collinsville	9973-GRP7-81
A-2-730	SF-780-A	Lower Sherman Island	9973-GRP7-89
A-2-732	SF-783-A	Kimball Island - Cabin Slough	9973-GRP7-93
A-2-734	SF-786-A	Mayberry Slough - Donlon Island	9973-GRP7-97

Sacramento County (Delta) (Cont.)

Old #	New #	Site Name	Page #
A-2-735	SF-789-A	West Island	9973-GRP7-101
B-2-750	SF-740-A	Sherman-Webb Reach	9973-GRP7-53
A-2-753	SF-743-A	Sevenmile Slough	9973-GRP7-61
AB-2-900	SF-800-AB	Sacramento River, Lower Reach	9973-GRP8-7
A-2-904	SF-804-A	Sacramento River, Horseshoe Bend at Decker Island	9973-GRP8-9
A-2-910	SF-810-A	Sacramento River, Lower Grand Island Reach	9973-GRP8-17
C-2-911	SF-811-C	Sacramento Anthicid Beetle Habitat	9973-GRP8-21
AC-2-913	SF-813-AC	Sacramento River, Isleton-Walnut Grove Reach	9973-GRP8-23
AC-2-914	SF-814-AC	Georgiana Slough	9973-GRP8-27
A-2-915	SF-815-A	Delta Cross Channel/Lower Snodgrass Slough	9973-GRP8-31
A-2-916	SF-816-A	Snodgrass Slough Complex	9973-GRP8-35
A-2-918	SF-818-A	Stone Lake Complex	9973-GRP8-39
AC-2-920	SF-820-AC	Sacramento River, Courtland-Sacramento Reach	9973-GRP8-41
A-2-940	SF-830-A	Steamboat Slough	9973-GRP8-45
AB-2-942	SF-832-AB	Sutter Slough	9973-GRP8-49
B-2-959	SF-859-B	Sacramento River Deep Water Ship Channel	9973-GRP8-69
A-2-970	SF-870-A	Mokelumne River Mouth	9973-GRP8-77
AB-2-973	SF-873-AB	North Mokelumne River	9973-GRP8-81
A-2-990	SF-890-A	Mokelumne River, New Hope Reach .	9973-GRP8-105
A-2-995	SF-895-A	Cosumnes River Reserve	9973-GRP8-107
A-2-996	SF-896-A	Mokelumne River, Thornton Reach	9973-GRP8-109

San Joaquin County (Delta)

Old #	New #	Site Name	Page #
A-2-760	SF-60-A	San Joaquin River,	9973-GRP10-45
A-2-765	SF-70-A	Potato Slough	9973-GRP10-53
A-2-767	SF-80-A	Whites Slough	9973-GRP10-57
A-2-769	SF-65-A	Little Potato Slough	9973-GRP10-49
A-2-770	SF-50-A	San Joaquin River	9973-GRP10-41
A-2-775	SF-45-A	Disappointment Slough	9973-GRP10-37
A-2-780	SF-40-A	San Joaquin River, Hog Island Cut Complex	9973-GRP10-33
A-2-784	SF-33-A	Fourteenmile Slough	9973-GRP10-29
A-2-785	SF-30-A	San Joaquin River, Roberts Island Reach	9973-GRP10-25
A-2-787	SF-18-A	Burns Cutoff at Rough and Ready Island	9973-GRP10-13
A-2-788	SF-15-A	Calaveras River Mouth at San Joaquin River	9973-GRP10-9
A-2-789	SF-10-A	San Joaquin River, Port of Stockton	9973-GRP10-5
A-2-790	SF-20-A	San Joaquin River, Stockton to Lathrop Reach	9973-GRP10-17
A-2-791	SF-21-A	French Camp Slough	9973-GRP10-21
A-2-830	SF-900-A	Old River Mouth at San Joaquin River	9973-GRP9-7
A-2-835	SF-910-A	Old River: Quimby Island Complex	9973-GRP9-17
B-2-845	SF-920-B	Old River: Orwood Reach	9973-GRP9-29
A-2-848	SF-924-A	Woodward Canal	9973-GRP9-37
A-2-852	SF-927-A	Widdows and Eucalyptus Islands	9973-GRP9-45
A-2-854	SF-929-A	Victoria Canal	9973-GRP9-49
A-2-860	SF-930-A	Old River: Fabian Tract Reach	9973-GRP9-53
A-2-862	SF-932-A	Grant Line Canal (West)	9973-GRP9-57

San Joaquin County (Delta) Cont.

Old #	New #	Site Name	Page#:
B-2-864	SF-934-B	Tom Paine Slough	9973-GRP9-61
A-2-868	SF-935-A	Paradise Cut	9973-GRP9-63
A-2-870	SF-940-A	Old River, Stewart Tract Reach	9973-GRP9-65
A-2-880	SF-950-A	Middle River, Mandeville Reach	9973-GRP9-67
A-2-882	SF-960-A	Mildred Island/Latham Slough	9973-GRP9-75
A-2-885	SF-965-A	Middle River: Bacon Island Reach	9973-GRP9-87
A-2-887	SF-970-A	Middle River: Upper Jones Tract	9973-GRP9-91
B-2-889	SF-974-A	Trapper Slough	9973-GRP9-95
A-2-890	SF-980-A	Middle River: Union Island Reach	9973-GRP9-97
A-2-895	SF-952-A	Columbia Cut	9973-GRP9-71
A-2-897	SF-963-A	Turner-Empire Cut	9973-GRP9-79
A-2-898	SF-964-A	Whiskey Slough	9973-GRP9-83
A-2-980	SF-880-A	South Mokelumne River	9973-GRP8-85
A-2-982	SF-882-A	Sycamore Slough	9973-GRP8-89
A-2-984	SF-884-A	Sycamore Island	9973-GRP8-93
A-2-986	SF-886-A	Hog Slough	9973-GRP8-97
A-2-988	SF-888-A	Beaver Slough	9973-GRP8-101
A-2-990	SF-890-A	Mokelumne River, New Hope Reach	9973-GRP8-105
A-2-996	SF-896-A	Mokelumne River, Thornton Reach	9973-GRP8-109

Solano County (Delta)

Old #	New #	Site Name	Page #
A-2-700	SF-700-A	Entrapment Zone	9973-GRP7-7
A-2-708	SF-752-A	Chipps Island, Southern Side	9973-GRP7-65
A-2-710	SF-755-A	Spoonbill Creek	9973-GRP7-69
A-2-712	SF-757-A	Van Sickle Island	9973-GRP7-73
A-2-715	SF-760-A	Montezuma Slough - East Mouth	9973-GRP7-77
A-2-717	SF-765-A	Montezuma Island and Collinsville	9973-GRP7-81
AB-2-900	SF-800-AB	Sacramento River, Lower Reach	9973-GRP8-7
A-2-910	SF-810-A	Sacramento River, Lower Grand Island Reach	9973-GRP8-17
A-2-940	SF-830-A	Steamboat Slough	9973-GRP8-45
AB-2-942	SF-832-A	Sutter Slough	9973-GRP8-49
A-2-950	SF-850-A	Cache Slough	9973-GRP8-61
A-2-955	SF-855-A	Miner Slough	9973-GRP8-65
A-2-960	SF-860-A	Prospect Slough	9973-GRP8-73
A-2-965	SF-840-A	Lindsey Slough	9973-GRP8-57

Yolo County (Delta)

Old #	New #	Site Name	Page #
AB-2-942	SF-832-AB	Sutter Slough	9973-GRP8-49
A-2-944	SF-834-A	Elk Slough	9973-GRP8-53